

*ELEMENTS of the COMET of May 19, 1846.*

Professor Peirce has calculated the following elements from the Cambridge, U.S., observations of May 19th, 21st, and 22d :—

Perihelion Passage .....	1846, June 4 <sup>h</sup> 6423	Greenwich M. S. T.
Perihelion Distance .....	0.64612	
Inclination .....	29° 15' 5	
Long. Perihelion .....	164 23.7	
Long. Node .....	264 5.9	
Motion, retrograde.		

*Reduction of the Observations of Halley's Comet, made at the Cambridge Observatory in the years 1835 and 1836.* By the Astronomer Royal.

These observations were chiefly made with the 5-foot equatoreal. They were reduced as far as was practicable at the time, and the corrections for refraction and parallax applied. In this state they were published in the Cambridge Observations for 1835.

The instrumental errors, though pretty well known, and known to be small, were not then corrected. It was thought better to put off this part of the complete reduction until correct places of the small stars of comparison could be obtained. In 1836 and 1837 most of these stars were observed at Greenwich, and they are sufficiently numerous to establish all the results which can be drawn from the observations of the comet. Some stars could not be seen, though carefully looked for.

In exhibiting the results two methods have been followed. First, The place of the comet has been determined *differentially* with respect to small stars, which have themselves been subsequently determined. Secondly, The error of the instrument has been computed from the observations of known stars, admitting of accurate observation, and the error so deduced has been applied to correct the instrumental observation of the comet. A comparison of these results will often shew which is to be preferred.

The final results are compared with the Ephemeris circulated by the Superintendent of the N. A., under the date Dec. 30, 1835, which is the same, as to places unaffected by perturbation, with the Ephemeris in the Appendix to the N. A. of 1839. In this Ephemeris the effects of aberration are fully included, contrary to the supposition of the Astronomer Royal in the *Cambridge Observations*, 1835, p. lxiv.

It has not been thought advisable to deduce the elements of Halley's Comet from these observations. That task will be best performed by some future Rosenberger, who, with all the observations from both hemispheres before him, may hope to bring a satisfactory result out of the whole mass.

The work is divided into sections :—

1. A catalogue of stars of comparison.
2. Errors of Ephemeris in R.A. from differential observations only.
3. Computation of the index Errors of the Equatoreal in R.A.
4. Errors of the Ephemeris in R.A. from the data of the previous section.
5. Errors of the Ephemeris in R.A. from differential transits at the Mural Circle.
6. Errors of the Ephemeris in N.P.D. from differential observations only.
7. Computation of the Index Errors in N.P.D. of the Equatoreal.
8. Errors of the Ephemeris in N.P.D. from the data of the last section.
9. A tabular collection of all the previous results, with remarks.

*On a proposed Alteration of Bessel's Method for the Computation of the Corrections by which the Apparent Places of Stars are derived from the Mean Place.* By the Astronomer Royal.

After mentioning the great superiority in uniformity and simplicity of Bessel's method over those previously in existence, the Astronomer Royal remarks, that the strict attention to *sign* required both in the partial additions and in collecting the sum, is exceedingly troublesome, and that more errors in observatory business arise from oversight as to *sign* than from any other cause. He has, therefore, been led to consider the possibility of avoiding changes of sign, and suggests the following method as probably an improvement in giving the data of the *corrections* in the Ephemeris and Catalogue.

On examining the *maximum* values of the quantities A, B, C, D, in the *Nautical Almanac*, and of *a, b, c, d; a', b', c', d'*, in the B.A. Catalogue, it will be seen that A, B, and D, can never be equal to 25, that *c'* is always less than 25, and that up to a north polar distance of  $3^{\circ} 45'$ , *c* must also be less than 25. All the other numbers are less than 1.2.

Let $E = A + 25$	Let $e = a + 1.2$	Let $e' = a' + 1.2$
$F = B + 25$	$f = b + 1.2$	$f' = b' + 1.2$
$G = C + 1.2$	$g = c + 25$	$g' = c' + 25$
$H = D + 25$	$h = d + 1.2$	$h' = d' + 1.2$

All the introduced symbols are necessarily positive.  
Arranging and multiplying

$$\begin{aligned} A a &= E e - 1.2 E - 25 e + 30 \\ B b &= F f - 1.2 F - 25 f + 30 \\ &\&c. \qquad \&c. \end{aligned}$$

And

$$\begin{aligned} A a' &= E e' - 1.2 E - 25 e' + 30 \\ &\&c. \qquad \&c. \end{aligned}$$